

CASI Crash Data Dictionary

A Dictionary of Terms, Measurements and Concepts

Introduction

The goal of this data dictionary is to provide information to enable a better understanding of the data. This is a working document and will be revised and updated as needed. It is part of our ongoing Crash Analysis, Statistics & Information (CASI) effort to provide reliable information in an easy to use format.

Motor vehicle crash data provides the information necessary to increase public awareness of highway safety issues including protective behavior of seat belt use, the dangers of certain types of roads and high-risk behavior such as drinking and driving. Data helps the public understand that highway safety issues impact many aspects of their lives. Crashes result in an economic cost of increased insurance rates and public expenditures. They produce a drain on law enforcement in both time and money, and pose a personal risk to every driver, passenger and pedestrian in Georgia. Funding of programs, equipment and activities is based on fact-based documentation of need. Without documentation, need cannot be demonstrated, effective programs will not be designed and funding will not be forthcoming.

Data Sources

Crash Data

The Georgia Department of Motor Vehicle Safety (DMVS) is the state agency responsible for recording and maintaining motor vehicle crash data. It is the only data source for motor vehicle crashes that is consistent from county to county and year to year.

DMVS data may differ from federal or local databases due to different record keeping or varying data definitions and error rates. Motor vehicle crash data is recorded by the law enforcement officer at the crash scene on the DMVS 523 - the Georgia Uniform Motor Vehicle Accident Report. Over 320,000 accident reports are filed with the DMVS each year. Data is entered by the DMVS into a relational database that contains the major data elements necessary for crash analysis. The DMVS Accident File is not directly linked with any other state or local databases, such as the roadway file at DOT or the Emergency Medical Services file.

License Driver or Driver History Data

Driver data is collected and maintained by DMVS. Georgia has more than five million licensed drivers. Driver information is established with the license application at the local county office. The driver file contains license status, traffic violation convictions, driver characteristics, and renewal information. It does not contain crash history unless the crash resulted in a conviction for a traffic violation. Speeding convictions for less than 15 mph over the speed limit are not recorded. Seat belt violation convictions for persons over age 4 are not entered but child safety seat violation convictions for persons under age 5 are entered. It is recommended that data users refer to the Georgia legal code for further clarification.

CASI Crash Data Dictionary

Roadway Data

The Georgia Department of Transportation (DOT) is the state agency responsible for collection, recording and maintenance of roadway characteristics. The DOT maintains roadway characteristics such as functional classifications, traffic volumes, speed limits, number and width of lanes, traffic flow and maintenance ratings. Roadway data is stored on the DOT mainframe computer in the Road Inventory File. The number of miles traveled by motor vehicles or traffic count is estimated from periodic surveys conducted on select roadways by the DOT. The mileage is used to calculate the vehicle miles traveled (VMT). VMT is available for the state, counties and cities and resides on the DOT mainframe computer. There is no direct link between the crash files at DMVS and the roadway files at DOT. Currently the DOT obtains crash data electronically from the DMVS and assigns crash location. As with many other crash data elements, difficulties arise at the crash scene. Officers at the scene may not be aware that the crash location is within city limits or specific roadway characteristics may not be recorded. Once the crash data has been entered at the DOT, extensive road characteristics can be obtained on the crash site such as the pavement type or traffic flow.

Population Data

The U.S. Census Bureau produces estimates of population. The estimates of the county populations are calculated from the base populations from either Census 2000 or the revised population estimate for the most recent year and then the demographic components of population change are added or subtracted. The estimated births are added and then the estimated deaths for the time period are subtracted. Net migration is calculated using several components including: net internal migration, net foreign-born international migration, net movement to/from Puerto Rico, net Armed Forces movement, the change in group-quarters population, and native emigration from the United States.

Understanding and Analyzing Crash Data

Motor vehicle crash data provides information on several levels. It first and foremost provides a count of the number of crashes, vehicles, drivers, injuries, fatalities and other important involved elements and factors. In addition to a number count of crashes, injuries and fatalities, the count can also be calculated as a rate to allow comparisons over time or from one group to another. For example, driver age comparisons can be made by examining the number of crashes per 100,000 licensed drivers from one age group to another. Comparison can also be made of crashes or injuries involving various high-risk behaviors by comparing rates with or without the high-risk behavior. By knowing the rate of crashes per licensed driver or per vehicle miles traveled, the probability that a crash will occur under certain conditions or with certain drivers can be assessed. The probability or risk can then be used to determine if modification of certain conditions or behaviors would reduce the number of crashes and the resulting injuries.

There are three main categories of risk to drivers, passengers and pedestrians: the risk of actually being in a motor vehicle crash, the risk of being injured, and the risk of being fatally injured. These risks are measured in several different ways. For example, the risk of actually being in a crash can be measured by the number of crashes per licensed driver or per vehicle miles traveled.

CASI Crash Data Dictionary

This will give the risk or frequency within a specific exposure time or group. The risk of being injured can be measured by examining the percent of crashes that result in injury or the rate per licensed driver. The risk of receiving a fatal injury can be measured by the number of fatally injured persons out of the total number of persons injured in the crash or by the injury or fatality rate per licensed driver.

Risks to pedestrians pose particular problems. Pedestrian crashes and injuries cannot be standardized correctly because we have no measure for the number of pedestrians in Georgia or the number of miles traveled by pedestrians. Therefore no realistic rate can be calculated and the rate per 100,000 licensed driver or population is used as a proxy measurement. For other groups such as the beginning driver or the older driver, determining the risk may be problematic because the exposure to the risk of a crash or the actual miles they drive is unknown. Again the rate per 100,000 licensed driver or population is used as a proxy measurement.

For each risk there are different extenuating circumstances and contributing factors and these contributing factors may combine to increase or decrease risk. For example, not only the lack of occupant protection, but also the speed of the vehicle may affect the risk of injury on a motorcycle compared to a bicycle. Even reasonable rates of speed will affect the severity of injury to an unprotected driver or passenger. That would explain, in part, why motorcycle crashes result in a higher number of persons receiving serious injuries, compared with the slower moving bicycle.

Other elements also affect risk factors. Impaired driving and speeding increase both the risk of a crash taking place and the risk of injury. Alcohol and/or drug involvement increases not only the risk of being in a crash, but also the risk of being injured for all types of crashes, whether they involve pedestrians or crashes with drivers of specific age groups. Vehicle type is also a factor: certain vehicles may have a high crash risk and others a high injury risk. Crashes involving very massive vehicles such as railway trains or tractor trailers have a moderate crash rate or risk, but pose a very high risk of injury or death to vehicle occupants of the smaller vehicle involved in the crash.

Determining the factors associated with motor vehicle crashes, injuries and fatalities is dependent upon reliable and timely data, and also the utilization of data from multiple sources. Each data source is highly complex. For example, the data from the Department of Motor Vehicle Safety is composed of several different files including crash, person and vehicle files. Each file requires separate analysis and standardization in order to provide the proper comparisons. For each crash there may be one or more drivers and vehicles, and multiple persons, occupants, injuries and fatalities. Because of this complexity the data must be read carefully to avoid confusion. For example the number of injury crashes does not equal the number of injuries or that the number of persons does not necessarily equal the number of occupants.

Often multiple factors combine to produce a crash and the factors that contribute to fatal crashes can be different than those common in non-fatal crashes. The diverse factors include physical conditions, roadway and vehicle factors, driver behavior, experience, and physical condition, and many others. Roadway factors include the design and engineering such as proper shoulder

CASI Crash Data Dictionary

design, road condition and maintenance such as clear striping. Vehicle factors such as condition, body type, weight, engineering, and safety devices such as seatbelts or airbags clearly affect crashes, injuries and fatalities. Physical conditions can include weather, rain, snow or sun glare. Driver behavior, experience, and physical condition are all factors in motor vehicle crashes. Sociological factors involving group dynamics such as multiple teens in a vehicle or anthropological aspects such as a culture of speed also play a part.

The data is further complicated by the conditions under which it is gathered. The crash scene may be chaotic, violent, and dangerous to police personnel, especially when persons are seriously or fatally injured. Under these conditions, errors can and do occur and require crash site investigations and data verification. Crash data verification is time consuming and expensive, but absolutely essential. Only with reliable data can the risks to drivers, passengers and pedestrians be accurately assessed.

Databases must be examined for idiosyncrasies and weaknesses. No database is without error. If the error is consistent throughout in data element definition and methodology it is reliable but not necessarily 100 percent accurate. Reliability is a measure of consistency within the database. Accuracy is a measure of error within the database. In some cases due to inherently high error rates for certain data elements complex, high level statistical analysis may be inappropriate. If the database is reliable it can be used with the understanding that total accuracy has not been achieved but because the data is reliable changes from year to year or differences between groups can be assessed.

In some cases, appropriate standardization of crash data may be limited. For example, in regional analysis of crashes, the rate per licensed drivers may be appropriate for the majority of counties, but problematic for border counties with a high number of drivers from other counties or states. For this reason, it is recommended that such factors be taken into account when examining county level data. The rate per licensed drivers may be the only tool available to evaluate critical driver age or gender groups; it is used to compare age groups within counties. Another potential problem in county level data occurs when the number of incidents is very low. Rates calculated from an incidence of five or below are very inaccurate; therefore rates have not been calculated for crashes, injuries or fatalities that fall within this range. Interpretation of data with very low incidence should be approached with extreme caution.

It is recommended that all highway safety data be read with the understanding that not only is the data are derived from diverse and complex sources, but the causes of crashes are diverse and complex. Each data source presents unique problems in collection, recording and analysis. Each of the contributing circumstances pose unique problems in finding and accessing appropriate and reliable data. The complex data sources and contributing variables necessitate a broad approach. An analysis that takes into account trends over time, standardized incidence rates and issue specific variables, yields the best picture and ultimately the data necessary for effective problem solving.

Definitions

Alcohol and/or Drug Related Motor Vehicle Crash

A motor vehicle crash with a pedestrian or at least one driver driving under the influence of alcohol, drugs, or a combination of both alcohol and drugs. Determined by blood alcohol levels (BAC) or observations by the law enforcement officer at the scene of the crash. Alcohol and/or drug related crashes are coded under Driver Condition of Alcohol (4) Drugs (5) & Alcohol and Drugs (6).

Bus

Large motor vehicle used to carry 16 or more passengers including the driver.

Citations

Uniform Traffic Citations issued to the driver at the crash scene. May not include citations related to the crash issued at a later date. Citations can be for any of the crash contributing factors and for other violations listed in Georgia law.

Contributing Factors

Any circumstance or driver behavior that appears to the law enforcement officer at the crash scene to have contributed to the crash. There may be multiple contributing factors for each crash, therefore there can be more contributing circumstances than crashes occurring in any given year. Presented as a count of the number of times the contributing factor was noted. More than one contributing factor may be noted for a driver. Contributing factors include: Driving under the influence, following too close, failed to yield, exceeding speed limit, disregarded stop sign/signal, wrong side of road, weather conditions, improper passing, driver lost control, changed lanes improperly, object or animal, improper turn, parked improperly, mechanical or vehicle failure, surface defects, misjudged clearance, improper backing, no signal/improper signal, driver condition, driverless vehicle, too fast for conditions, improper passing of school bus, disregarded police officer, distracted, and other. Inattentive and cell phone have been added in 2004.

Crash

An unintended event that produces an injury and/or property damage (minimum of \$500) which occurs on a public roadway and involves at least one motor vehicle in transport. Does not include motor vehicle crashes that occur on private property, such as in driveways or private parking areas.

Crash Severity

The count of crashes by the highest level of severity of injury.

Fatal Crash - A crash on a public roadway in which at least one person dies within 30 days of the crash.

Serious Injury Crash - A crash on a public roadway in which at least one person receives an incapacitating injury. A serious injury is any injury that prevents the injured person from walking, driving or normally continuing the activities that the person was capable of prior to the accident.

CASI Crash Data Dictionary

Moderate or Visible Injury Crash - A crash on a public roadway in which at least one person receives a visible but not incapacitating injury. A visible injury is any injury that is evident to any person other than the injured at the scene of the accident.

Minor or Complaint Injury Crash - A crash on a public roadway in which at least one person receives a possible but not visible injury. Complaint of injury is coded if there are possible injuries that are claimed or indicated by behavior but not by wounds.

Property Damage Only Crash - A crash on a public roadway in which there is property damage of at least \$500 but no one involved is injured.

Driver

The person in physical control of the vehicle at the time of the crash. The number of drivers is almost always equal to or greater than the number of crashes. In some cases pedestrians may be also counted as drivers.

Fatal Crash

A motor vehicle crash that results in at least one person dying as a direct result of crash injuries within 30 days of the traffic crash. Georgia data includes the death of a fetus. National traffic data does not include fetal deaths.

Fatalities

The count of the number of persons dying as a direct result of crash injuries within 30 days of motor vehicle crash. Georgia data includes the death of a fetus. National traffic data does not include fetal deaths. The number of fatalities is always equal to or greater than the number of fatal motor vehicle crashes.

First Harmful Event

The first event in a crash that caused injury or property damage. Associated with the crash event, only one code may be used and every crash must have a code. Event codes include:

Non-Collision - Overturn, fire/explosion, immersion, jackknife, and other non-collision.

Collision with Object Not Fixed - Pedestrian, pedalcycle, railway train, animal, parked motor vehicle, motor vehicle in motion, motor vehicle in motion in other roadway, deer, and other object not fixed.

Collision with Fixed Object - Impact attenuator, bridge pier/abutment, bridge parapet end, bridge rail, guardrail fence, guardrail end, median barrier, highway traffic sign post, overhead sign support, luminaire/light support, utility pole, other post, culvert, curb, ditch, embankment, fence, mailbox, tree, and other fixed object.

Fixed Object

Stationary structures, objects, trees or substantial vegetation.

Injuries

The count of the number of persons receiving injuries due to a motor vehicle crash. The number of injuries is always equal to or greater than the number of injury motor vehicle crashes.

Injury Crash

A motor vehicle crash that results in at least one person being injured.

CASI Crash Data Dictionary

Injury Severity

Severity of injury to the person in the crash. Reported at the crash scene by the law enforcement officer. The categories are, in order of severity: death, serious, visible, complaint, and no injury. See *Crash Severity*.

Large Trucks

Trucks of at least 10,000 pounds including single unit trucks, tractor trailers, logging trucks and truck tractors.

Licensed Drivers

A count of the valid and suspended licensed drivers in Georgia taken on the first Tuesday of the following new year. Count includes persons licensed to drive with Class P permits. Does not include drivers with expired licenses.

Manner of Collision

A method of classifying collisions between two vehicles by the first harmful event. The types include: an angle collision which was not head-on, rear-end, rear-to rear, or sideswipe; a head-on collision which was a front end collision between two vehicles traveling in opposite directions, a rear-end collision in which the point of impact was the rear end of one vehicle, and a sideswipe collision in which the point of impact was the sides of both vehicles.

Metropolitan Statistical Areas

Metropolitan Statistical Areas (MSA) are determined by the U.S. Census Bureau. For Georgia the MSA counties are as follows: *Atlanta Metropolitan Counties*: Clayton, Cobb, DeKalb, Fulton, Gwinnett; *Atlanta Suburban Counties*: Barrow, Bartow, Carroll, Cherokee, Coweta, Douglas, Fayette, Forsyth, Henry, Newton, Paulding, Pickens, Rockdale, Spalding, Walton; *Other Metropolitan Statistical Area (MSA) Counties*: Bibb, Bryan, Catoosa, Chatham, Chattahoochee, Clarke, Columbia, Dade, Dougherty, Effingham, Harris, Houston, Jones, Lee, Madison, McDuffie, Muscogee, Oconee, Peach, Richmond, Twiggs, Walker; *Rural Counties*: All other counties.

Most Harmful Event

The event during a crash that was judged to have produced the highest level of injury or damages. Associated with the vehicle, only one code may be used and every vehicle must have a code. See *First Harmful Event* for event codes.

Motorcycle

A two or three wheel motorized vehicle including motorcycles, scooters and minibikes.

Object Not Fixed

Objects that are moving or moveable, such as animals, deer, pedestrians, bicycles, trains or debris on roadway.

Occupant

A person riding in or on a vehicle, such as driver, passenger or riding in bed of pickup truck.

CASI Crash Data Dictionary

Occupant Protection Devices

Refers to vehicle seat belts, shoulder harnesses, air bags, and child safety seats.

Passenger Car

A motor vehicle designed for passengers including sedans, convertibles and station wagons.

Pedestrian

A person not riding in or in any way upon a vehicle and not on a bicycle.

Pedestrian Maneuver or Activity

The pedestrian action at the time of the crash including, crossing not at a crosswalk, crossing at a crosswalk, walking with traffic, walking against traffic, pushing or working on a vehicle, other working in road, playing in road, standing in road, off roadway, and other. Darting into traffic was added in 2004.

Percent

Calculated from totals within groups, excluding unknown or not stated data. Percents may not equal 100 due to rounding of numbers.

Pickup Truck

A motor vehicle 10,000 pounds or less designed to carry passengers and cargo.

Rate

A measure of how often an event occurs within a given population or group. The driver crash rate per 100,000 licensed drivers is calculated by dividing the number of drivers in crashes by the number of licensed drivers and multiplying by 100,000. The rate per 100,000 population is calculated by dividing the number of injuries or fatalities by the population, and multiplying by 100,000. The rate per 100 million vehicle miles traveled is calculated by dividing the number of crashes, injuries or fatalities by the number of vehicle miles traveled in 100 millions.

Ratio

A measure of the relationship between numbers. Obtained by dividing one number by the other. If the numbers are equal the ratio is one. Ratio can be presented as 'three to one' or 'three times greater'.

Road Type

Interstate - Limited access divided roadways with a minimum of four lanes designated by the Federal Highway Administration as part of the Interstate System.

State - Roadways part of the Georgia Department of Transportation's state road system. Usually a four lane divided roadway, but can be under four lanes without division or physical barrier.

County - Roadways under county systems, usually two lane without any division. Can be any size with or without division or physical barrier. Often narrow roads with speed limits higher than city streets.

CASI Crash Data Dictionary

City - Roadways under city systems, usually two lane without any division but can be any size with or without division or physical barrier. Often narrow roads with slower speed limits than interstate, state and county roads.

Safety Restraint Use

The vehicle occupant's use of safety restraints including lap belt, shoulder belt, harness or seat belt and harness. Seat belt use as noted by the law enforcement officer on the crash report for occupants over age 4. Persons on motorcycles, mopeds, bicycles, farm and construction equipment, or all terrain vehicles are excluded. Proper child safety seat use as noted by the law enforcement officer on the crash report for vehicle occupants under age 5. Children on motorcycles, mopeds, bicycles, farm and construction equipment, or all terrain vehicles are excluded.

Speeding

Speed related crashes include crashes involving the contributing factors of speeding too fast for conditions or exceeding the speed limit. Speed as a contributing factor to a crash is determined by the officer at the scene of the crash from physical evidence such as skid marks, or subjective evidence from witnesses of the crash. The notes by the law enforcement officer are often the only indication that speed contributed to the motor vehicle crash, and are used by national as well as local officials to record speed related motor vehicle crashes.

Trend Analysis

Method of measuring change over time or other factors for a specific group. For example the percent change from 1990 to 2000 is obtained by subtracting the number of occurrences in 2000 from the number of occurrences in 1990 and dividing the difference by the number of occurrences in 1990 and multiplying by 100. Also often referred to as percent change.

Utility Passenger Vehicles or Sport Utility Vehicle (SUV)

A motor vehicle designed for passengers including sports utility vehicles with frame and weight of either passenger cars or a pickup.

Vehicle

A motor vehicle upon a public roadway. The number of vehicles in motor vehicle crashes is always equal to or greater than the number of motor vehicle crashes.

Vehicle Type

The crash vehicle type, categories include: Passenger car, pickup truck, truck tractor (bobtail), tractor/trailer, tractor with twin trailers, logging truck, logging tractor/trailer, single unit truck, panel truck, van, utility passenger vehicle, vehicle with trailer, bus, truck towing house trailer, ambulance, motorized recreational vehicle, motorcycle, moped, bicycle, farm or construction equipment, all terrain vehicle, and other.

Vehicle Miles Traveled (VMT)

The number of miles traveled by motor vehicles in Georgia estimated from periodic surveys conducted on select roadways by the Georgia Department of Transportation.

CASI Crash Data Dictionary